

CHLOPSID EELS OF THE EASTERN PACIFIC WITH A NEW SPECIES AND DESCRIPTIONS OF LARVAL FORMS

Robert J. Lavenberg

ABSTRACT

Chlopsis kazuko, a new species of false moray eel (Anguilliformes: Chlopsidae) from the eastern Pacific, is described and illustrated from two metamorphosed individuals and two leptocephali. The adults were collected in the Gulf of California in 1940 by dredge from a depth of 53 m and from under a night light while at anchor. *C. kazuko* is distinguished from all other *Chlopsis* by a combination of characters: total vertebrae, color and pigment patterns, and origin of dorsal fin.

My purpose is to describe a new species of eastern Pacific *Chlopsis* and to compare the larval and adult stages of these eastern Pacific eels, in preparation for an account of chlopsid eels for a forthcoming book on the fishes of the Galapagos Islands. Among the unidentified eels in the Allan Hancock Foundation (AHF) Pacific Expeditions collections are two adult eels of an undescribed *Chlopsis* which lack collarlike neck or facial stripe markings and have low vertebral counts. Among the eel larvae in the fish collection at the Los Angeles County Museum of Natural History (LACM) are five individuals, representing two species, of *Chlopsis*, a genus with six known species.

The family Chlopsidae is represented by seven genera, of which only *Chlopsis* has been recorded in eastern Pacific waters. The eastern north Pacific *Thalassenchelys*, which Castle and Raju (1975) allocated to the Chlopsidae, is not a chlopsid (D. G. Smith, pers. comm.). However, its affinities remain unclear and it is designated as Anguilliformes, *Incertae sedis*. In the eastern Pacific, eels of the genus *Chlopsis*, which are rarely collected as adults, are restricted to tropical and subtropical waters, ranging from the Gulf of California south to the coast of South America off Ecuador and the Galapagos Islands. Three eastern Pacific species of *Chlopsis* have been described: *C. apterus* (Beebe and Tee-Van, 1938), *C. bicollaris* (Myers and Wade, 1941), *C. longidens* (Garman, 1899). *Chlopsis apterus* and *C. bicollaris* are known only from metamorphosed individuals; *C. longidens* is known only from a single leptocephalus. I propose a fourth species of eastern Pacific *Chlopsis* described below.

Chlopsis kazuko new species

Figure 1

Holotype.—LACM 22990, 113 SL, Mexico, Gulf of California. See material examined.

Paratype.—LACM 24145, 65 SL, metamorphosing larva, Mexico, Gulf of California. See material examined.

Referred Material.—LACM 33632-10, 72 SL, leptocephalus, eastern tropical Pacific off Costa Rica. See material examined.

Diagnosis.—A species of *Chlopsis* that differs from all others by a combination of color (melanophore distribution), dorsal fin origin and numbers of vertebrae (Table 1). Head and body pigment uniformly distributed and sharply demarcated in *kazuko*, heavily pigmented dorsally and unpigmented ventrally; *apterus* is

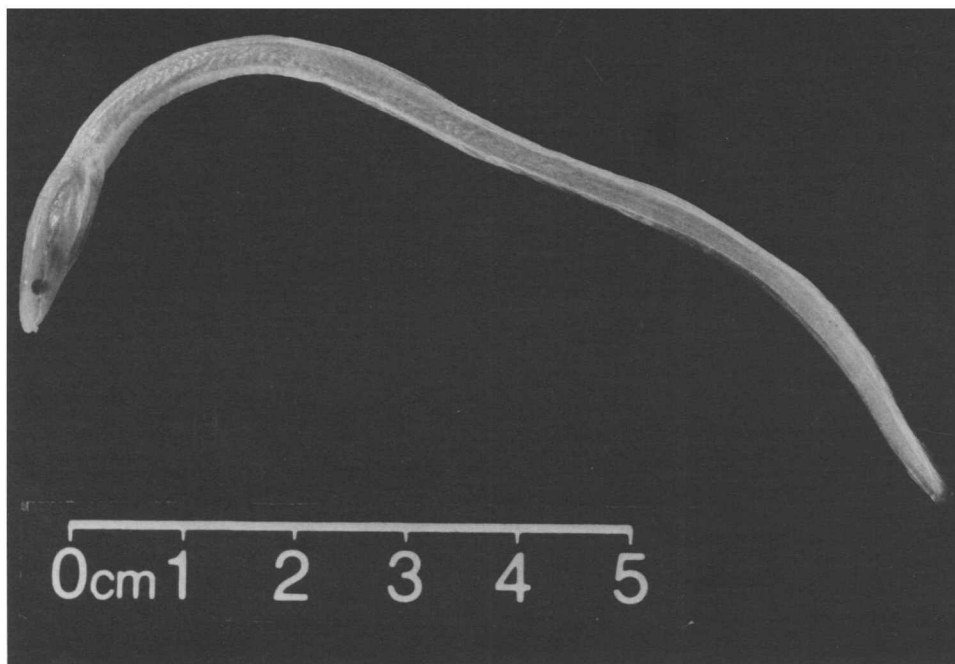


Figure 1. *Chlopsis kazuko*, holotype, LACM 22990, 113 mm SL.

similar but has a white stripe on snout; *bicollaris* has bands on its neck and on the anterior half of body; *bicolor* is similar but pigment extends only a little past middle of anal fin; *dentatus* is yellowish and thickly banded or mottled; *olokun* apparently is uniformly tan-brown with blotchlike ventral markings.

Counts and Measurements.—Counts and measurements in mm are given for the holotype, followed by the paratype. Vertebral formulae 9-39-126, 9-34-123; lateral line pores 1, 1; supraorbital pores 2, 2; suborbital pores 5, 5; mandibular pores 6, 5; SL 112, 64; head length 16.4, 9.5; trunk length 41, 22; tail length 71, 42; predorsal fin length 16.9, 9.3; body depth at gill opening 3.1, 3.4; body width at gill opening 2.7, 1.7; gill opening height (to top of gill opening) 1.1, 1.4; isthmus width between gill openings 3.1, 1.7; snout length 3.7, 1.8; orbit diameter 1.5, .7; length of upper jaw in gape 5.5, 3.1; interorbital width 1.5, 1.1.

General Description.—Body slightly compressed (not cylindrical), tapering to a soft caudal fin; greatest depth and width at gill openings, tapering gradually to caudal fin. Head bluntly rounded, depth and width of postorbital region greater than that of body, due to an expanded branchial basket; snout broad and flat, spatula-shaped; anterior nostril prominent, directed anteroventrally over front of upper jaw; posterior nostril not prominent, not tubular, opening ventrally onto lip in front of orbit, a thin fleshy unpigmented flap of tissue originating from upper lip lies over nostril opening; lower jaw and gape extend posteriorly beyond orbit about half the width of the orbit; orbit almost twice in snout; tongue adnate.

Small papillae on snout and lower jaw, more prevalent along lips, otherwise head and body everywhere smooth; dorsal fin origin above or slightly in advance of gill opening; dorsal and anal fins low but distinct throughout, confluent with

Table 1. Diagnostic characters in six species of *Chlopsis*, and their distribution

	<i>dentatus</i>	<i>kazuko</i>	<i>Olokun</i>	<i>bicolor</i>	<i>apterus</i>	<i>bicollaris</i>
Total vertebrae	116-124	123-126	125-139	127-134	134-138	139-150
Preanal vertebrae	31-34	34-39	40	39	36-39	40-43
Color/pigment	yellow, banded or mottled	tan, bicolored	tan, blotched ventrally	bicolored on anterior half of body only	bicolored, prominent snout stripe	bicolored two half collar neck bands
Dorsal fin origin relative to gill opening	behind	over or in front	over or in front	behind	behind	over or in front
Distribution	Atlantic, Western Indian Ocean	Eastern Pacific	West Africa	Mediterr., West Atlantic	Eastern Pacific	Galapagos Islands

Table 2. Frequency distributions of total vertebrae for eastern Pacific eels of the genus *Chlopsis*

Species		Numbers of vertebrae											
<i>C. kazuko</i>													
		123	124	125	126								
LACM 22990		—	—	—	1								
LACM 24145		1	—	—	—								
<i>C. apterus</i>													
		134	135	136	137	138							
CAS 46498		—	—	1	—	—							
LACM 22834		—	—	—	—	1							
LACM 32555		1	2	—	—	1							
LACM 32559		—	—	2	—	—							
<i>C. bicollaris</i>													
	139	140	141	142	143	144	145	146	147	148	149	150	
LACM 21545	—	—	—	—	—	—	1	—	—	—	—	—	—
LACM 21704	1	—	—	—	—	—	—	—	—	—	—	—	—
LACM 30360-1	—	—	—	1	2	1	—	2	—	—	—	—	1
UCLA W54-292	—	—	—	—	2	—	1	—	—	—	1	—	—
CAS 36549	—	—	—	—	—	—	—	1	—	—	—	—	—
CAS 36550	—	—	—	—	—	—	—	1	—	—	—	—	—

caudal fin; pectoral fins absent. Head pores conspicuous, except for the one branchial pore in the anterior part of the lateral line.

Teeth sharp, pointed, conical; seven large intermaxillary teeth surrounded by numerous small ones, in a circular-shaped patch; numerous maxillary teeth in three to four poorly defined rows, smallest teeth in outer row, tooth size gradually increases medially, teeth in medial row about twice the size of those in outer row; vomerine teeth biserial, about 14–16 teeth in each row, twice as large as largest maxillary teeth; maxillary and vomerine tooth rows extend posteriorly to posterior margin of orbit; except vomerine all teeth depressible.

Color in alcohol. Pigment a faded tan, and distinctly restricted to upper half of body.

Etymology.—It is with pleasure that this species is named in honor of Kazuko Nakamura in recognition of her faithful and dedicated service to the LACM section of fishes by single-handedly archiving the Giles W. Mead ichthyological library. Even though personal names as nouns in apposition should be avoided (Article 31, recommendation 31a, ICZN Code) *C. kazuko* is treated as a noun in apposition because formation of the personal name in the genitive case is clumsy.

Remarks.—Eels of the family Chlopsidae, formerly called Xenocongridae, have been reviewed by Böhlke (1956) and Böhlke and Smith (1968). The species named here is similar to other chlopsid eels in having a rudimentary lateral-line system on the body and the lateral-line pores on the head reduced to one. Also, as in other chlopsids, the posterior nostril has shifted ventrally to open onto the lip.

Number of vertebrae is important in distinguishing eastern Pacific species of *Chlopsis*, and at present there is no overlap between the three species (Table 2). Measurements and proportions of the three are similar, except that heads are broader and snouts longer in *C. bicollaris* than in the other two species (Table 3). Measurements of head length and dorsal-fin origin in a metamorphosing *C. kazuko* suggest marked allometry. Further, head length and dorsal fin origin appear to be correlated.

Table 3. Measurements for tropical eastern Pacific eels of the genus *Chlopsis*

Species	SL	% SL							
		Snout	Orbit	Post orbit	Inter orbit	Head	Depth	Pre-dorsal	Pre-anus
<i>C. apterus</i>									
LACM 32555-14	120	2.5	1.1	8.9	1.3	12.5	4.2	15.0	34.2
SIO68-55-26	122	2.6	1.2	9.1	1.2	12.9	4.1	16.1	34.0
LACM 32555-14	135	2.4	1.2	8.7	1.1	12.2	4.1	14.2	33.7
LACM 32555-14	150	2.5	1.0	9.1	1.0	12.7	4.0	14.3	33.7
LACM 22834	151	1.9	1.5	8.3	1.3	11.8	3.9	13.6	31.8
UCR 686-3	196	2.6	1.1	7.5	1.3	13.0	3.5	14.4	33.2
LACM 32555-14	224	1.8	1.3	8.3	1.1	11.4	2.9	13.2	33.0
UCR 686-3	243	2.3	1.0	8.8	1.6	12.1	2.8	13.7	33.9
<i>C. bicollaris</i>									
LACM 30360-1	90	2.9	1.6	10.4	2.6	14.9	4.7	14.0	31.5
LACM 30360-1	91	3.1	1.7	10.0	2.2	14.8	4.4	14.0	30.5
LACM 30360-1	91	3.2	1.6	11.5	2.0	16.3	4.4	14.8	30.5
LACM 30360-1	91.5	3.3	1.6	9.6	1.9	14.5	4.4	13.2	29.0
LACM 30360-1	93	3.3	1.7	10.5	2.1	15.5	4.6	14.0	31.5
LACM 30360-1	93.5	3.2	1.7	10.6	1.8	15.5	4.5	14.8	31.5
LACM 30360-1	95	3.3	1.6	10.7	3.0	15.6	5.2	14.9	31.5
LACM 30360-1	99	3.3	1.7	11.4	2.3	16.4	5.1	15.4	33.0
LACM 21545	158	2.5	1.1	8.5	2.0	12.2	4.9	11.6	33.2
LACM 21704	163.5	3.7	1.7	11.2	2.1	16.6	5.7	15.4	35.8
<i>C. kazuko</i>									
LACM 24145	64	2.8	1.0	10.9	1.7	9.5	3.4	9.3	22.0
LACM 22990	112	3.3	1.3	10.0	1.3	16.4	3.1	16.9	41.0

Arrangement of pigment on the snout and neck is useful in identifying the three eastern Pacific *Chlopsis* (Fig. 2)

KEY TO EASTERN PACIFIC ADULT EELS OF THE GENUS *CHLOPSIS*

- 1a. Dorsal fin origin about a snout length behind opercular opening; vertebrae 134–138 *apterus*
- 1b. Dorsal fin origin over or in front of opercular opening; vertebrae 123–150 2
- 2a. Collarlike unpigmented bands on neck just behind orbit and just in front of dorsal fin, narrow bands anteriorly on body; vertebrae 139–150, preanal vertebrae 40–43 *bicollaris*
- 2b. No collarlike markings on neck, no stripe on snout, no bands on body; vertebrae 123–126, preanal vertebrae 34–39 *kazuko*

Leptocephali. — The larvae at hand are typical chlopsid leptocephali as evidenced by possession of a short, simple, straight, tubular gut extending about 40% of SL; a long-based dorsal; and nearly straight, oblique myomeres. The five specimens of eastern Pacific leptocephali reported here agree well with the diagnosis of Smith (1969) for Chlopsidae and, with the following exceptions, agree with his larval description: liver more anterior, terminating at myomere 10 or 12 rather than 15; first vertical blood vessel near myomere 8 rather than 11–14, renal artery near myomeres 38–46 rather than 42–47, renal portal vein near myomeres 43–51 rather than 50–55; iris pigment absent

Leptocephali of five of the seven chlopsid genera (*Catesbya*, *Chilorhinus*, *Chlopsis*, *Kaupichthys*, *Robinsia*) are known (Castle, 1984; Smith, 1969; 1979). Of the principal characters used to distinguish these leptocephali (i.e., pigment pattern, myomeres, and meristics), the distribution of midlateral pigment is most useful in identifying the five known genera. Midlateral pigment is present in *Catesbya*,

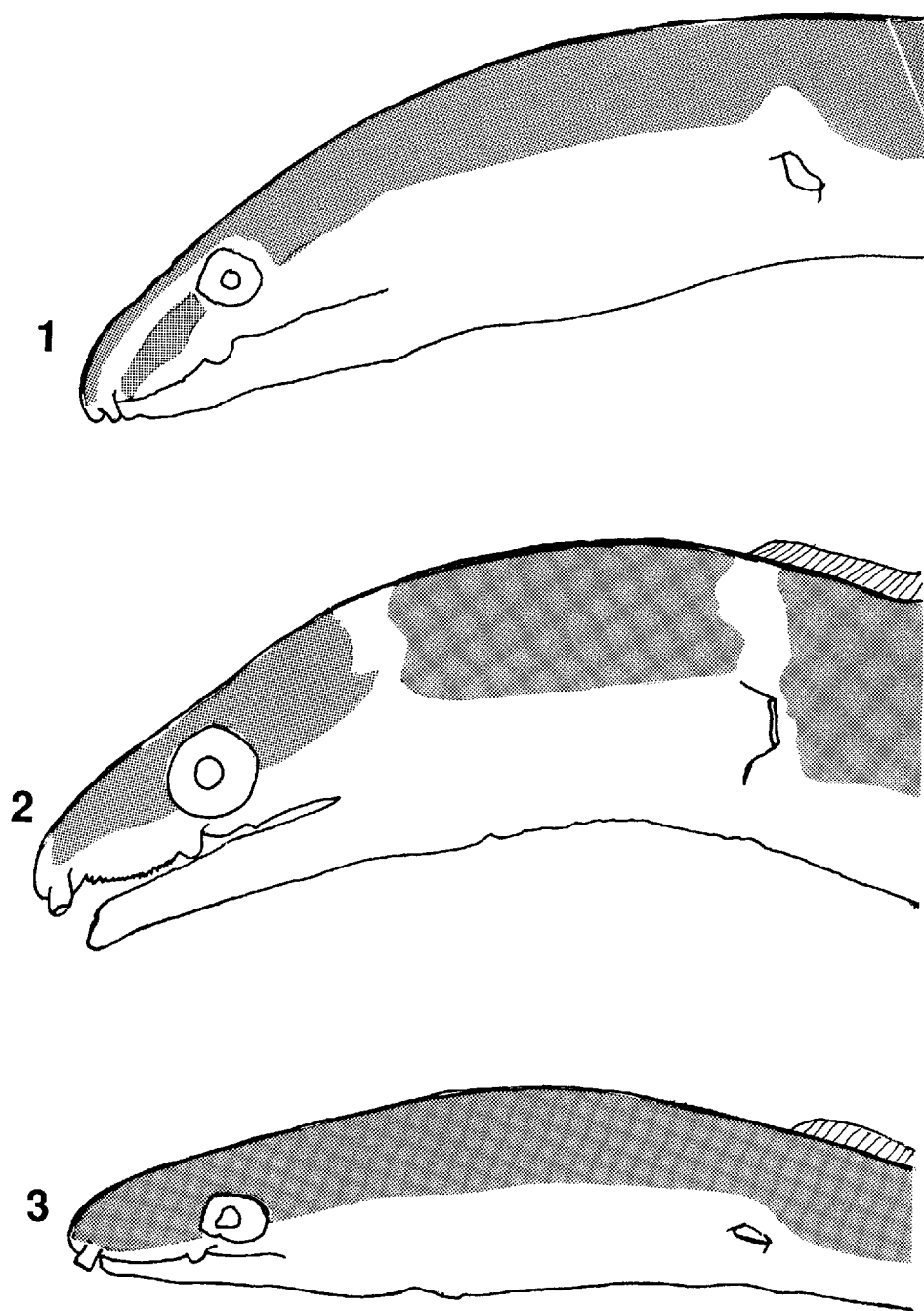


Figure 2. Facial pigment patterns in eastern Pacific *Chlopsis*: 1. *C. apterus*; 2. *C. bicollaris*; 3. *C. kazuko*.

Chilorhinus, *Chlopsis*, *Kaupichthys* and *Robinsia*, and unknown in *Powellichthys* and *Xenoconger* (leptocephali remain unknown for these latter two genera). The leptocephali of *Chlopsis* differ from those of *Catesbya*, *Chilorhinus*, *Kaupichthys* and *Robinsia*, by having small midlateral melanophores arranged in an irregular double row rather than having them uniserially arranged, or restricted posteriorly, or in large spots. Castle (1984) recognized three unidentified chlopsid leptocephali, none of which have midlateral pigment as in *Chlopsis*. Although Castle (1984, table 22) did not indicate midlateral pigment for *Catesbya* larvae, it is present and identical to *Kaupichthys hyoprорoides* (Smith, 1969; David Smith, pers. comm.).

On the basis of the simple, short gut and the midlateral pigment pattern, the five eastern Pacific chlopsid leptocephali at hand are referred to *Chlopsis*. Of the five known species of *Chlopsis*, the leptocephalus of two have been identified with their adult counterparts, *C. bicolor* in the Mediterranean, Gulf of Mexico, and eastern Atlantic (Schmidt, 1912; Smith, 1969; Blache, 1972), and *C. olokun* in the Gulf of Guinea (Blache, 1972). The eastern Pacific chlopsid larvae are similar in having the same arrangement of midlateral and head pigment, tiny uniserially-arranged melanophores along the base of the anal fin, and stomach and gut pigment, all of which are probably diagnostic for the genus. However, eastern Pacific larvae differ in the numbers of myomeres, position of nephros relative to gut, and lack of iris pigment, characters that serve as the basis for recognizing two additional kinds of *Chlopsis* larvae in the eastern Pacific, which are described below.

Chlopsis apterus

Figure 3

Diagnosis.—A leptocephalus differing from all other eastern Pacific *Chlopsis* larvae by having 135–140 myomeres (40–43 preanal), a nephros that extends well past the end of the gut, and origin of dorsal fin between myomeres 15 and 18.

Remarks.—This larval *Chlopsis* has two oblique rows of tiny melanophores on the cheek just behind the articulation of the jaws, the first row with two pigment spots and the second with four (Fig. 3b). There are no melanophores over the heart. A uniserial row of melanophores begins just behind the heart, beneath the third myomere, extending to the end of the gut and lying dorsal to the stomach and gut (Figs. 3a and 3b). Midlateral pigment begins on the fourteenth myomere, becomes biserial at the twentieth myomere, and extends to within four myomeres of the caudal fin. After the twentieth myomere the lateral pigment consists of one, two, or three melanophores per segment (Fig. 3c). There is a uniserial row of numerous tiny melanophores on the anal fin between the anus and caudal fin, which is most distinct posteriorly (Fig. 3d). In one larva the melanophores extend the length of the fin, but in the other three they are indistinct or appear to be restricted to the posterior third to half.

The nephros is long, extending three to four myomeres beyond the end of the gut, and lacks pigment (Fig. 3c; Table 4). The gut terminates between myomeres 40–43, whereas the nephros terminates under myomeres 44–45. There are three principal blood vessels originating, respectively, beneath myomeres 8 (over the liver), 38–40 (the renal artery anterior to the end of the gut), and 43–44 (the renal portal vein posterior to the gut but anterior to the end of the nephros [Fig. 3b, c; Table 4]). The dorsal fin originates well forward over myomeres 15–18. Myomere counts vary between 135–140, with 40–43 preanal and 46–49 predorsal (Table 5).

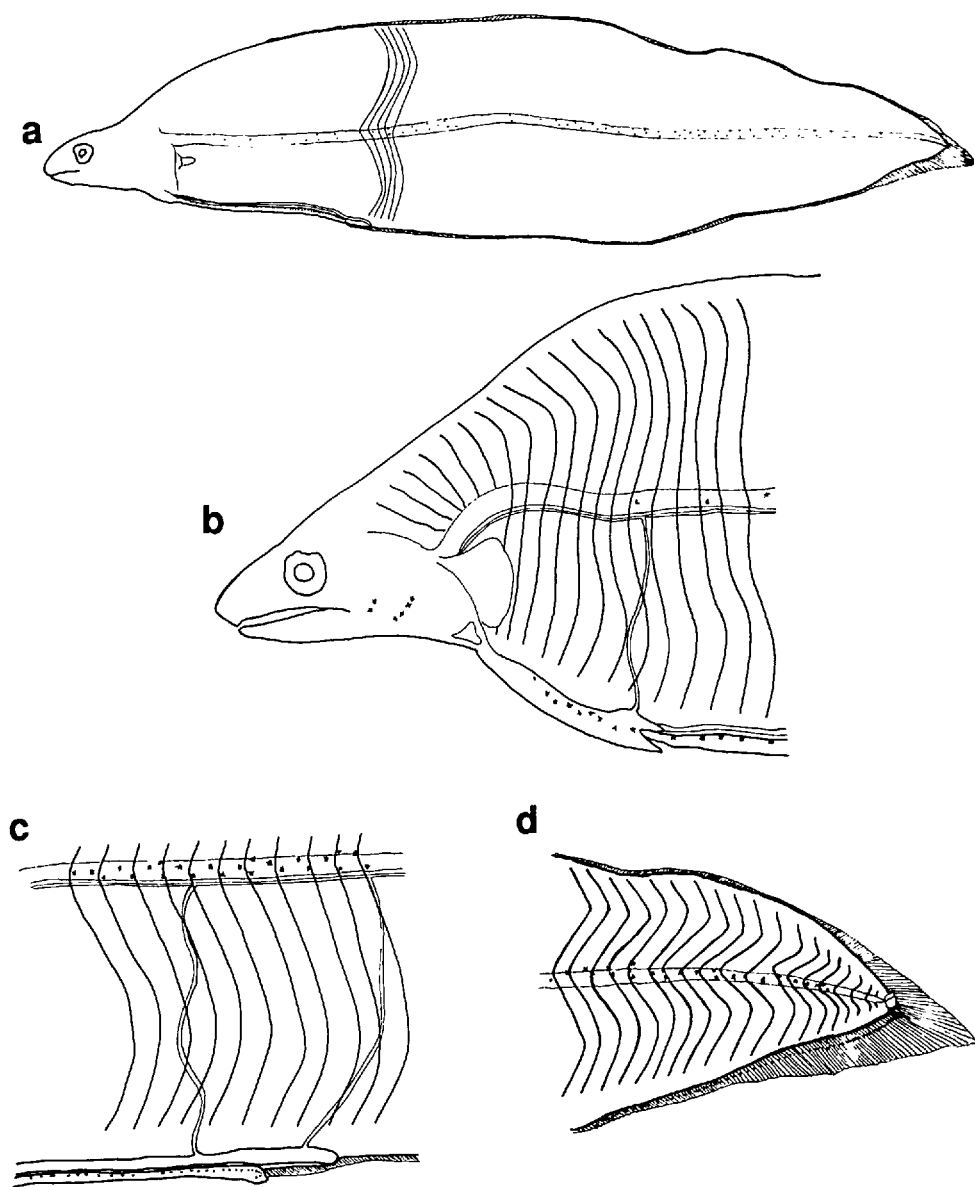


Figure 3. Leptocephalus of *Chlopsis apterus*, LACM 33560-8, 68 mm SL: A. entire leptocephalus; B. head; C. anal region; D. caudal region.

Chlopsis kazuko

Diagnosis.—A leptocephalus differing from other eastern Pacific *Chlopsis* larvae by having 130 myomeres (47 preanal), and a gut and nephros of equal length.

Remarks.—The arrangement of the pigment on this leptocephalus is not substantially different from that described for *Chlopsis apterus*. Besides myomeres, the principal difference between this larva and *C. apterus* lies in the morphology of the gut and nephros. In *C. kazuko* the gut and nephros are of the same length,

Table 4. Preanal myomere counts of leptocephali of *Chlopsis apterus* and *C. kazuko*

Species	First vertical vessel	End of liver	Gall bladder	Renal artery	End of gut	Renal portal vein	End of nephros
<i>C. apterus</i>							
LACM 33560-8	8	10	8-10	39	41	44	45
LACM 33595-18	8	10	8-10	40	42	44	45
LACM 33597-27	8	10	8-10	40	43	44	45
LACM 33599-26	8	10	8-10	38	40	43	44
<i>C. kazuko</i>							
LACM 33632-10	8	12	8-10	40	47	46	47
SIO55-249-26A	—	—	—	46	51	51	51

terminating beneath myomere 47 (Table 4). The nephros is unpigmented. The three principal blood vessels originate beneath myomeres 8 (over the liver), 40 (in front of the end of the gut/nephros), and 46 (just in front of the end of the gut/nephros [Table 4]). The dorsal fin originates well forward over myomere 22. There are 130 myomeres (47 preanal and 52 predorsal [Table 5]).

KEY TO EASTERN PACIFIC LEPTOCEPHALI OF THE GENUS *CHLOPSIS*

- 1a. Number of myomeres 130 or fewer, preanal 47; gut and nephros of equal length; renal portal vein originates at nephros between myomeres 46-51 *kazuko*
- 1b. Number of myomeres greater than 130, preanal 40-51; gut and nephros of equal or unequal length 2
- 2a. Number of preanal myomeres 40-43; nephros longer than gut; renal portal vein originates from nephros between myomeres 43-44 *apterus*
- 2b. Number of preanal myomeres 51; gut and nephros of equal length *longidens*

Comparison of Larval and Adult Eels.—Measurements and meristics from 25 metamorphosed eels were compared with the larvae (Tables 2 and 3). Nine *Chlopsis apterus* had between 134-138 vertebrae (36-39 preanal). The dorsal fin originates about a snout length behind the opercular opening, and a distinctive unpigmented stripe precedes the orbit.

Fourteen *Chlopsis bicollaris* had between 139-150 vertebrae (40-43 preanal). The dorsal fin originates over or just in front of the opercular opening. Two dorsal unpigmented bands form half-collarlike saddles on neck, one behind the orbit and the other in front of the dorsal fin. Several unpigmented bands lie along the midline of the anterior half of the body. No nasal pigment in the form of a stripe. One recently metamorphosed juvenile (91 mm SL; LACM 30360-1) retains the midlateral pigment spots; the pigmented gut was 16 myomeres posterior of the anus and the unpigmented nephros extended another 5-6 myomeres beyond the end of the gut.

Two *Chlopsis kazuko* had 123 and 126 vertebrae (34, 39 preanal). They have the upper half of the head and body dusky brown, and lack a stripe on the snout, the half-collar bands on the neck, and bands on the body. The dorsal fin originates just in front or over the opercular opening. The gut in the smaller specimen (65 mm SL; LACM 24145) is unpigmented and extends five myomeres beyond the anus, whereas the pigmented nephros is another 16 myomeres posterior of the anus.

The position of the anus may move forward during metamorphosis in some eel leptocephali (Castle, 1984), and in *Chlopsis*, the migration may equal a distance as great as 10 myomeres (David Smith, pers. comm.). This forward movement

Table 5. Counts and measurements of leptocephali of *Chlopsis apterus*, *C. kazuko* and *C. longidens*

Species	SL	Preanal length mm/% SL	Head length mm/% SL	Body depth mm/% SL	Total myomeres	Preanal myomeres	Predorsal myomeres
<i>C. apterus</i>							
LACM 33560-8	68.0	27.5/40	6.0/9	10.0/15	139	41	18
LACM 33595-18	72.0	29.5/41	5.0/7	10.5/15	138	42	16
LACM 33597-27	76.0	29.0/38	5.5/7	11.5/15	140	43	15
LACM 33599-26	73.5	27.5/37	5.5/7	10.5/14	135	40	18
<i>C. kazuko</i>							
LACM 33632-10	72.0	29.0/40	5.0/7	10.5/15	130	47	22
SIO55-249-26A	62.0	—	—	—	127	—	—*
<i>C. longidens</i>							
MCZ 28420	64.0	—	—	—	140	51	—†

* Data from Orton, 1964.

† Data from David Smith, and Garman, 1899.

of the anus resolves the discrepancy between the number of preanal myomeres (40–43) and preanal vertebrae (36–39) in *Chlopsis apterus*, indicating a shift of the anus anteriorly equal to at least 7 myomeres. In *Chlopsis kazuko* the scale of movement is about the same as for *C. apterus*. If a similar movement of the anus is assumed for *C. longidens* larvae then their adult counterparts would have 140 vertebrae of which 44 would be preanal. Such a counterpart exists in *Chlopsis bicollaris*.

Taxonomic Status of Atopichthys longidens.—In 1899 Garman described several species of eel larvae, including *Atopichthys longidens*. D'Ancona (1928) apparently recognized Garman's larva as being essentially similar to the Mediterranean larva of *Chlopsis bicolor* because he listed *C. longidens* as a possible synonym of *C. bicolor*. Orton (1964) agreed to calling *C. longidens* the eastern Pacific counterpart of larval *C. bicolor*. Orton points out that Schmidt (1912) first identified the distinctive *C. bicolor* larva, which has been well illustrated (Grassi, 1913; Sparta, 1939). She proposed to use the name *Leptocephalus longidens* as a convenient group category to designate larvae of the *C. bicolor* group, probably because of an inability to recognize specific leptocephali and to associate them with adults. That Orton (1964) had several larval forms of eastern Pacific *Chlopsis* is demonstrated by her notation of 127–146 myomeres, which is essentially the range for the number of vertebrae of adults (123–150).

Chlopsis longidens is based upon a 64-mm larva (MCZ 28420), 140 myomeres (called somites by Garman) of which 51 are preanal. The illustration (Garman, 1899: plate LXVII, figures 5–5a) shows a pigment pattern typical of *Chlopsis*. Noteworthy are the melanophores over the heart, and the equal length of nephros and gut. Otherwise, Garman's description of *C. longidens* is inconclusive. The holotype is in reasonably good condition but heavily stained (dark brown) and wrinkled (D. Smith, pers. comm.).

The unique type specimen of *Chlopsis longidens* was collected offshore of the continental shelf of northern Ecuador (0°36'N, 82°46'W). It remains unassociated with an adult eel. *C. longidens* may prove to be the larva of *Chlopsis bicollaris*, which so far as known is endemic to the Galapagos Islands.

I recognize four species of *Chlopsis* from the eastern Pacific: *C. apterus* (Beebe and Tee-Van, 1938), *C. bicollaris* (Myers and Wade, 1941), *C. kazuko* Lavenberg, and *C. longidens* (Garman, 1899). The binomen *Leptocephalus longidens* should

not be used as a group category to designate larval *Chlopsis* (sensu Orton, 1964), as the name applies to a particular species (Castle, 1969).

MATERIAL EXAMINED, ALL FROM THE EASTERN PACIFIC

Chlopsis apterus: SIO68-55-26, 1(122 SL), Mexico, Gulf of California, E. of Cabo San Lucas, 23°3.6'N., 109°28.4'W., 41 ft otter trawl, 119–155 m, January 10, 1968. LACM 22834, 1(151 SL), Colombia, north of Gorgona Island, 3°01'N., 78°10'55"W., AHF Exped. stat. 854-38, dredge, 40–60 fms (mud and rock), February 24, 1938 (original catalog number AHF 135). LACM 32555-14, 4(120–224), Costa Rica, Puntarenas Prov., Isla del Cano, Searcher 480, March 16, 1972. UCR 686-3, 2(196–243), Costa Rica, Puntarenas Prov., Isla del Cano, Searcher 484, March 17, 1972. CAS 46498, 1(135, holotype), Mexico, Gulf of California, off Arena Bank, 23°29.3'N., 109°25.3'W., dredge, 82 m, April 20, 1936. LACM 33560-8, 1(68 SL, leptocephalus), Costa Rica, 10°25'N., 86°12'W., May 5, 1973, 1120–1308 hrs. LACM 33595, 1(72 SL, leptocephalus), Costa Rica, 9°15'N., 84°55'30"W., May 17, 1973, 1950–2000 hrs. LACM 33597, 1(76 SL, leptocephalus), Costa Rica, 9°11'N., 84°57'W., May 17, 1973, 2210–2230 hrs. LACM 33599, 1(73.5 SL, leptocephalus), Costa Rica, 9°13'N., 84°59'W., May 17, 1973, 2355–0050 hrs.

Chlopsis bicollaris, all from the Galapagos Islands: LACM 21545, 1(158 SL, holotype), Isabela Island, Cartago Bay, AHF Exped. stat. 798-38 dipnetted under electric light, January 21, 1938 (original catalog number AHF 11). LACM 21704, 1(163.5 SL), Isabela, North Beach, AHF Exped. stat. 73-33, February 13, 1933. LACM 30360-1, 8(90–99 SL), Galapagos Islands, Santa Cruz Island, Canal de Itabare, dipnetted under electric light, 24 February 1957. W54-292, 4(85–101, Galapagos Islands, Fernandina Island, SW end of Island at anchorage, dipnet, 45 m 8 March 1954. [LACM 21704 listed above has uncertain type status. It was received from AHF labelled "AHF stat. no. 798-38," probably confused with the holotype, and doubtless is an error. Of the three uncatalogued paratypes (AHF Exped. stat. 73-33) listed by Myers and Wade (1941) in their description of *bicollaris* I presume that one is at the LACM (21704) and two are at the CAS (SU 36549 and 36550). All AHF station data were checked in Fraser (1943).]

Chlopsis kazuko.—LACM 22990, 1(113 SL, holotype), Mexico, Gulf of California, Boca de la Trinidad, AHF Exped. stat. 1037-40 D-3, dredge, 51–53 fms (sand, coralline), 21 January 1940 (original catalog number AHF 821). LACM 24145, 1(65 SL, metamorphosing larva, paratype), Mexico, Gulf of California, Arroyo de San Luis, 23°10'N., 109°25'W. (anchorage), AHF Exped. stat. 1036-40, dipnetted under electric light, 20 January 1940 (original catalog number AHF 820). LACM 33632-10, 1(72 SL, leptocephalus), Costa Rica, 8°29'36"N., 84°24'12"W., 5 May 1973, 0020–0055 hrs. SIO55-249-26A, m1(62 SL, leptocephalus), Isla Malpelo, 4°3'N., 81°40'W., 0–393 m, 20 November 1955. The 62-mm leptocephalus referred to by Orton (1964) as *Leptocephalus longidens* (SIO55-249-26A) cannot be located and is presumed to have been destroyed.

Methods and Abbreviations.—Standard length (SL) is used throughout, and all measurements are expressed in millimeters (mm). Vertebral formulae follow the system of Böhlke (1982). All leptocephali reported here were collected using a 10-ft Isaacs-Kidd midwater trawl. Institutional acronyms are as given in Leviton et al., (1985).

ACKNOWLEDGMENTS

For help in gathering data I express my appreciation to: M. E. Anderson (CAS), M. E. Böhlke (ANSP); for allowing me access to collections: M. E. Anderson, D. Buth (UCLA), W. Bussing (UCR), R. Rosenblatt (SIO), H. J. Walker (SIO); for review of the manuscript: W. Bussing, D. M. Cohen (LACM), M. Meisler (LACM), S. Schaefer (LACM), A. N. Sedor (LACM), D. Smith (MCZ), and C. Swift (LACM). I especially thank the LACM staff, Jeffrey Seigel and Richard Feeney for their enthusiastic support and assistance, Brenda Rounds in cheerfully typing away on word processors, and the staff photographers.

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DATE ACCEPTED: May 22, 1987.

ADDRESS: Section of Fishes, Los Angeles County Museum of Natural History, 900 Exposition Boulevard, Los Angeles, California 90007.